What is the future of fast track finding for trigger applications beyond Atlas and CMS Phase II Upgrade?

1. Is an aggressive R&D in this field sufficiently motivated?
2. Which are the most promising directions we should explore?
    1. Associative Memory ASICs vs. FPGAs
    2. Retina/Hough transform
    3. Tracklets
    4. Cellular Automata
    5. GPUs
    6. Commercial CPUs
    7. .....

Is an aggressive R&D in this field sufficiently motivated?
an example

- In the post-Higgs era, in absence of of new physics, the key to progress in our field will be precision measurements
- The HL-LHC at 10^{35} will produce ~10^{14} Beauty and Charm decays/year. If we can harvest most of them we could bring the precision of CP violation measurement in rare decays from the present ~ 10^{-2} to below ~10^{-4}
- To do this we will need to change the way we perform experiments
- 10^{14} x 1 MB = 10^{20} bytes = 10^{5} PB/year -> No way!
- We need to read out the detector for every single crossing, perform an almost complete analysis in real time and retain only the information relevant to the process of interest (e.g. few tracks involved in the decay)
- This involves finding all tracks down to low momentum, identifying decay vertices, computing invariant masses...the complexity of this problem is 10-100 times worse than what we are now trying to solve for CMS Phase II
- 10^{14} x 1 KB = 100 PB/year -> Possible!